ISSN 0820-8107

Forestry Canada Forêts Canada

91-05252/

NO. 249

Forestry Canada - Maritimes Region

TECHNICAL NOTE

PLANTATION PEST ASSESSMENT SURVEY IN NOVA SCOTIA IN 1990

Multi-agency plantation pest assessment surveys have been carried out in Nova Scotia since 1987. The objective of the survey is to detect pest problems and to assess the damage levels. Continued increase in wood demand has led to an increase in the number of natural stands harvested, while a commitment to reforestation of these harvested areas has led to an increase in the number of plantations. Tree growth and development is threatened by insects and diseases. Regular plantation pest assessment provides information on insect and disease damage that is helpful to forest managers in protecting their investments.

The large and ever-increasing number of plantations has necessitated the involvement of a number of organizations in the plantation assessments. In 1990, participating organizations were:

- Nova Scotia Dept. of Lands and Forests (NSLF)
- STORA Forest Industries (STORA)

The Forest Insect and Disease Survey unit of Forestry Canada - Maritimes Region (FIDS) provided planning, training, co-ordination, identification services, analysis, and summary.

NURSERIES

PLANTATIONS

SILVICULTURE

UTILIZATION

ECONOMICS

TREE IMPROVEMENT

INSECTS AND DISEASES

Forestry Canada - Maritimes Region
P.O. Box 4000, Fredericton, N.B. E3B 5P7
P.O. Box 667, Truro, N.S. B2N 5E5
P.O. Box 190, Charlottetown, P.E.I. C1A 7K2

Cette publication est aussi disponible en français sur demande

Detailed examination was made of 50 trees in each of the plantations were assessed. Ten subplots of five trees were selected along a pre-determined line of travel through the plantation. The distance between subplots varied according to the size of the plantation, ensuring good coverage and an adequate representation of conditions. Pest conditions encountered between subplots or off the line of travel were noted but not included in the calculations. They are listed with problems assessed (Table 5.).

A total of 7 569 trees were assessed by NSLF, STORA and FIDS in Nova Scotia in 1990, 92% of which were reported as healthy. Moderate or severe damage was found on some of the trees in 45 of the 153 (29%) plantations surveyed.

The total number of plantations surveyed in Nova Scotia in 1990 was 153 (Table 1.); of these, 108 were spruce, 37 were pine, and 8 were of other species.

The results of the survey are presented here in a series of tables, organized to show tree health conditions in the seven NSLF forest resource management regions of Nova Scotia.

A brief discussion of some of the plantation pests and problems follows the tables.

Table 1. Summary of plantation assessments by tree species and organization conducting field work in the various resource management regions in Nova Scotia in 1990.

Region	Tree species	Total plantations assessed	Organization		
			NSLF	STORA	FORCAN
Cape Breton	Red pine	1	1	0	0
	Black spruce	22	12	10	0
	White spruce	9	8	1	0
	Red spruce	1	1	0	0
	Mixed spruce	2	2	0	0
	Mixed species	2	0	2	0
Total	for Region	37	24	13	0
Eastern	Red pine	9	5	3	1
	White pine	1	1	0	0
	Black spruce	17	5	11	1
	White spruce	5	4	1	0
	Red spruce	1	1	0	1
	Norway spruce	1	0	1	0
	Mixed spruce	3	1	2	0
	Spruce (unspec)	2	0	2	0
	Mixed species	5	0	5	0
Total	for Region	44	17	25	2
North Central	Red pine	4	4	0	0
	Black spruce	2	1	0	1
	White spruce	1	1	0	0
	Red spruce	4	4	0	0
	Mixed spruce	1	1	0	0
Total	for Region	12	11	0	1
South Central	Jack pine	1	1	0	0
	Red pine	3	3	0	0
	White pine	1	1	0	0
	Black spruce	3	3	0	0
	White spruce	2	2	0	0
	Red spruce	2	2	0	0
	Norway spruce	3	3	0	0
Total	for Region	15	15	0	0
South Shore	Red pine	3	3	0	0
	Mixed pine	1	1	0	0
	Black spruce	2	1	0	1
	Red spruce	3	3	0	0
	Norway spruce	3	3	0	0
	Mixed spruce	1	1	0	0
Total	for Region	13	12	0	1
Valley	Balsam fir	1	0	0	1
	Red pine	1	0	0	1
	Black spruce	1	1	0	0
	Red spruce	5	5	0	0
Total	for Region	8	6	0	2
Western	Jack pine	1	1	0	0
	Red pine	10	9	0	1
	White pine	1	1	0	0
	Black spruce	6	6	0	0
	Red spruce	4	4	0	0
	Norway spruce	2	2	0	0
Total	for Region	24	23	0	1
Total for Nova Scotia		153	108	38	7

Table 2. Condition of pine and spruce trees by tree part in plantations assessed in the resource regions of Nova Scotia in 1990.

Region	Number of trees	NEEDLES Frequency of Condition (%) Healthy	Trace	Light	Mod.	Sev.	BUDS Frequency of Condition (%) Healthy	Trace	Light	Mod.	Sev.	SHOOTS Frequency of Condition (%) Healthy	Trace	Light	Mod.	Sev.
Pine																
CB	50	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	60.0	40.0	0.0	0.0	0.0
E	498	69.9	10.6	4.0	14.9	0.6	99.2	0.4	0.4	0.0	0.0	95.2	3.2	1.4	0.2	0.0
NC	198	53.0	43.4	2.0	1.5	0.0	100.0	0.0	0.0	0.0	0.0	91.9	7.1	1.0	0.0	0.0
SC	243	79.8	14.8	2.9	2.5	0.0	99.6	0.4	0.0	0.0	0.0	97.9	0.0	1.2	0.8	0.0
SS	196	98.5	1.5	0.0	0.0	0.0	88.8	9.7	0.0	1.5	0.0	100.0	0.0	0.0	0.0	0.0
V	50	0.0	60.0	40.0	0.0	0.0	90.0	10.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
W	599	51.9	31.7	5.8	6.5	4.0	91.0	5.0	3.7	0.3	0.0	91.7	6.8	1.5	0.0	0.0
PROVINCIAL AVERAGE		**65.5**	**21.7**	**4.7**	**6.7**	**1.5**	**95.3**	**3.1**	**1.3**	**0.3**	**0.0**	**93.7**	**5.0**	**1.1**	**0.2**	**0.0**
Spruce																
CB	1690	81.0	11.5	4.3	2.7	0.5	95.1	2.8	1.4	0.6	0.1	91.4	5.2	2.7	0.7	0.0
E	1420	89.2	8.8	1.4	0.6	0.1	88.0	9.6	2.2	0.1	0.1	96.1	2.8	1.0	0.1	0.0
NC	398	66.1	14.6	19.1	0.3	0.0	98.7	1.0	0.3	0.0	0.0	98.0	1.5	0.5	0.0	0.0
SC	485	85.2	5.6	3.1	4.1	2.1	87.4	8.2	3.1	0.8	0.4	99.8	0.0	0.2	0.0	0.0
SS	450	70.7	23.1	5.6	0.7	0.0	99.8	0.0	0.2	0.0	0.0	99.8	0.2	0.0	0.0	0.0
V	299	91.0	6.7	0.3	1.3	0.7	99.3	0.0	0.7	0.0	0.0	95.0	3.7	1.3	0.0	0.0
W	598	91.1	5.7	2.2	0.7	0.3	98.8	0.2	0.2	0.5	0.3	95.3	0.5	1.2	1.3	1.7
PROVINCIAL AVERAGE		**83.3**	**10.5**	**4.2**	**1.6**	**0.4**	**93.9**	**4.3**	**1.4**	**0.3**	**0.1**	**95.3**	**2.8**	**1.4**	**0.4**	**0.2**
OTHER																
CB	100	75.0	18.0	6.0	1.0	0.0	97.0	0.0	2.0	1.0	0.0	74.0	18.0	7.0	1.0	0.0
E	245	94.3	5.7	0.0	0.0	0.0	98.4	1.6	0.0	0.0	0.0	95.5	4.5	0.0	0.0	0.0
V	50	34.0	64.0	2.0	0.0	0.0	94.0	6.0	0.0	0.0	0.0	20.0	76.0	4.0	0.0	0.0
PROVINCIAL AVERAGE		**81.8**	**16.2**	**1.8**	**0.3**	**0.0**	**97.5**	**1.8**	**0.5**	**0.3**	**0.0**	**88.5**	**17.0**	**2.3**	**0.3**	**0.0**

Number of trees: Although 50 trees are assessed in each plantation, the number of dead trees are subtracted from the total. Dead trees are not assessed by tree part and therefore can not be analyzed by tree part.

BRANCHES					STEMS					LEADERS			ROOTS	
Frequency of Condition (%)					Frequency of Condition (%)					Frequency of condition(%)			Frequency of Condition(%)	
Healthy	Trace	Light	Mod.	Sev.	Healthy	Trace	Light	Mod.	Sev.	Healthy	Damaged	Dead	Healthy	Damaged
80.0	16.0	2.0	2.0	0.0	86.0	6.0	0.0	2.0	6.0	62.0	38.0	0.0	98.0	2.0
82.3	13.1	3.8	0.8	0.0	89.8	4.6	1.6	3.2	0.8	98.4	1.6	0.0	99.2	0.8
97.5	1.5	1.0	0.0	0.0	85.9	8.1	1.5	1.0	3.5	97.5	2.5	0.0	100.0	0.0
87.2	7.8	4.5	0.4	0.0	79.0	2.1	4.9	7.4	6.6	90.1	9.9	0.0	98.8	1.2
87.8	5.1	3.1	2.6	1.5	80.1	5.6	4.1	10.2	0.0	100.0	0.0	0.0	100.0	0.0
92.0	8.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	98.0	2.0	0.0	98.0	2.0
95.0	1.5	1.3	2.2	0.0	81.6	10.0	5.2	3.0	0.2	91.2	8.8	0.0	100.0	0.0
89.5	**6.4**	**2.6**	**1.3**	**0.2**	**84.4**	**6.4**	**3.4**	**4.1**	**1.7**	**94.0**	**6.0**	**0.0**	**99.5**	**0.5**
86.0	6.0	5.3	2.2	0.4	94.3	2.2	1.9	1.1	0.5	95.1	4.9	0.0	98.9	1.1
90.9	5.7	2.7	0.6	0.1	86.1	5.7	2.3	5.3	0.6	96.9	3.1	0.0	97.6	2.4
96.0	2.8	1.3	0.0	0.0	98.5	1.0	0.5	0.0	0.0	98.7	1.3	0.0	99.7	0.3
92.6	2.3	4.5	0.4	0.2	90.5	1.6	2.7	1.6	3.5	91.5	8.5	0.0	99.0	1.0
99.3	0.7	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	95.1	4.9	0.0	100.0	0.0
99.0	0.7	0.3	0.0	0.0	98.0	0.7	0.3	0.7	0.3	97.0	3.0	0.0	100.0	0.0
90.3	0.8	3.2	3.3	2.3	87.5	1.0	3.5	4.8	3.2	90.6	9.4	0.0	96.5	3.5
91.0	**4.0**	**3.3**	**1.3**	**0.4**	**92.0**	**2.6**	**1.9**	**2.5**	**1.0**	**95.1**	**4.9**	**0.0**	**98.5**	**1.5**
82.0	11.0	7.0	0.0	0.0	97.0	0.0	3.0	0.0	0.0	97.0	3.0	0.0	100.0	0.0
95.9	3.3	0.8	0.0	0.0	94.7	3.7	0.8	0.8	0.0	97.1	2.9	0.0	100.0	0.0
76.0	22.0	2.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0
89.9	**7.6**	**2.5**	**0.0**	**0.0**	**95.9**	**2.3**	**1.3**	**0.5**	**0.0**	**97.5**	**2.5**	**0.0**	**100.0**	**0.0**

Table 3. The condition of trees in plantations and thinned areas in the Maritimes in 1990.

Province	Species	Tree Condition (%)			
		Healthy	Fair	Poor	Dead
New Brunswick	Pine	91.8	4.6	2.3	1.3
	Spruce	94.3	2.9	1.2	1.6
	Other	94.3	3.3	1.3	1.0
	Thinned	94.7	3.2	1.2	0.9
	Average	93.8	3.4	1.4	1.4
Nova Scotia	Pine	92.1	4.0	3.1	0.9
	Spruce	91.8	5.4	1.8	1.1
	Other	94.5	1.5	2.8	1.3
	Average	91.9	4.9	2.2	1.1

Table 4. Plantations and thinned areas with at least some incidence of severe or moderate damage in the Maritimes in 1990.

Province	Species	Plantations		
		Number Assessed	Frequency (%) with Moderate	Severe
New Brunswick	Pine	52	27	33
	Spruce	132	22	26
	Other	18	17	44
	Thinned	17	41	23
	Total	219		
	Frequency		24	29
Nova Scotia	Pine	37	35	35
	Spruce	108	27	30
	Other	8	37	0
	Total	153		
	Frequency		29	29
Regional Total		372		
Regional Frequency			26	29

Table 5. Comparison of problems at all levels of severity with those at moderate and severe levels as assessed in plantation pest surveys in Nova Scotia in 1990.

	Percentage of Plantations Affected					
	Pine		Spruce		Other	
	Damage		Damage		Damage	
Problem:	all levels	Mod.& Sev.	all levels	Mod.& Sev.	all levels	Mod.& Sev.
Insects						
Adelgid	11	5	11	2	-	-
Aphid	22	3	11	3	13	-
Bark beetles	-	-	3	-	13	13
Conevorm	11	-	5	2	-	-
European pine shoot moth	41	14	-	-	13	-
Fall webworm	-	-	-	-	13	-
Leaf tier	-	-	-	-	13	-
Leaf roller	-	-	1	-	-	-
Needle miner	8	-	16	1	38	-
Northern pitch twig moth	3	-	-	-	-	-
Pine needle scale	3	-	-	-	-	-
Pine shoot borer	3	-	-	-	-	-
Root collar weevil	-	-	5	5	-	-
Sawfly	11	3	10	4	13	-
Spittlebug	3	-	3	1	-	-
Spruce bud midge	-	-	2	-	-	-
Spruce bud moth	-	-	7	4	-	-
Spruce budworm	-	-	7	-	-	-
Spruce gall midge	-	-	1	1	13	-
White pine weevil	8	8	11	3	-	-
Diseases						
Needle cast	3	-	3	-	13	-
Needle rust	16	5	16	1	38	-
Shoestring root rot	5	5	15	15	-	-
Sirococcus shoot blight	3	-	1	1	-	-
White pine blister rust	3	3	-	-	-	-
Other						
Animal	60	30	48	19	75	13
Competition: Hardwood	-	-	3	1	13	13
Softwood	-	3	3	3	-	-
Herbaceous	3	-	6	4	-	-
Unspecified	5	3	7	6	-	-
Development	5	3	5	1	25	25
Frost	3	-	25	7	25	-
Mechanical damage	19	3	12	2	25	-
Needle flecking	14	8	6	-	13	-
Nutrient deficiency	-	-	1	1	-	-
Planting	30	24	30	25	-	-
Snow damage	38	11	19	5	50	-
Weather	-	-	5	1	-	-
Wind damage	11	3	3	1	13	-
Winter damage	14	5	19	13	-	-

Calculations are based on the number of plantations assessed of each species: Pine = 37, Spruce = 108, and Other = 8.

DISCUSSION:

European pine shoot moth damage was reported in 41% of the pine plantations assessed (Table 5). This insect could be responsible for the high level of needle damage on the affected shoots in pine plantations (Table 2).

White pine weevil was frequently reported and likely contributed to stem damage in pine plantations (Table 2).

Animal damage occurred in 60% of the pine plantations. Porcupine, rabbit, and deer were the most frequently reported. Spruce plantations suffered only slightly less damage than the pine (Table 5).

Planting was found to be a problem in both the pine and spruce plantations. The most common planting problems were poor site selection, multiple planting and j-roots. These problems were found in both pine and spruce plantations. Poor planting affects tree growth and often results in the loss of trees. Most of these planting problems could have been avoided.

Shoestring root rot is a serious problem and was found in both pine (5%) and spruce (15%) plantations.

Snow caused significantly more damage in pine plantations than in spruce. Winter damage in spruce plantations likely contributed to the high level of needle damage observed.

R.A. Simpson
L.P. Magasi

Forest Insect and Disease Survey
Forestry Canada - Maritimes Region

March 1991